



UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
JANUARY 1978

WYOMING G WATER MANAGEMENT

TC
424
.W8
L362
1978

Bureau of Land Management
Library
Denver Service Center

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

ID 88347192

TC
424
.W8
L362
1978

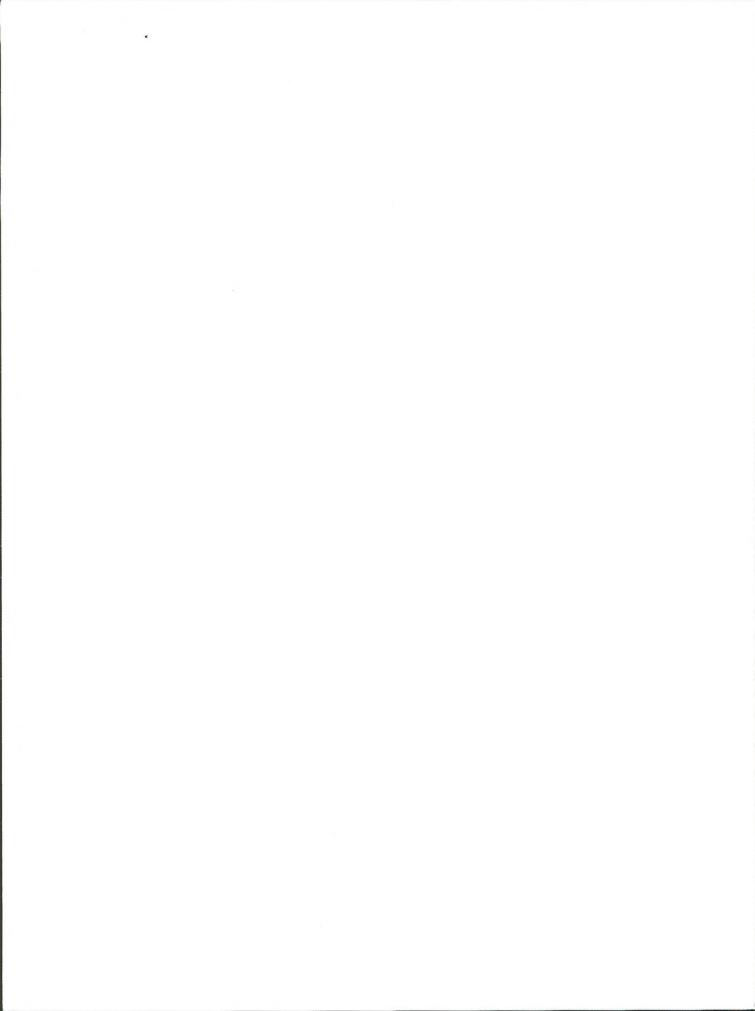
STATE OF WYOMING WATER MANAGEMENT PROGRAM

United States Department of the Interior
Bureau of Land Management
January 1978

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
PO BOX 25047
DENVER, CO 80225

Bureau of Land Management
Library
Denver Service Center

Prepared by: Richard W. Quisenberry Date 7/6/77
State Hydrologist
Recommended by: W. S. Leonard Date 2/12/77
Chief, Division of Resources
Approved by: Van Buren Date 7/19/77
State Director, Wyoming



WATER MANAGEMENT PROGRAM

Table of Contents

	<u>Page</u>
I. Introduction.....	1
II. Policies.....	5
III. Objectives.....	8
IV. Roles.....	10
V. Program Composition.....	14
A. Support Service to all Activities.....	16
1. Watershed.....	17
2. Forestry.....	18
3. Lands.....	20
4. Minerals.....	21
5. Range.....	22
6. Wildlife.....	23
7. Recreation.....	24
8. Engineering.....	25
9. Emergency Rehabilitation.....	25
B. Activity Operations.....	25
1. Water Management and the Bureau Planning System.....	27
2. Water Resource Investigation.....	29
a. Reconnaissance Hydrologic Surveys.....	31
b. Long Term Data Network.....	32
c. Surveillance and Monitoring.....	32
3. Water Quality	33
4. Water Uses and Rights.....	46
5. Instream Flow Needs.....	36
6. Watershed Rehabilitation and Maintenance.....	36
VI. Responsibilities.....	40
A. State Director.....	40
B. District Manager.....	41
VII. Summary.....	41
VIII. References Cited.....	45
IX. Appendices.....	46
A. Current Program Directives (Reserved).....	
B. District Water Management Programs (Reserved).....	
C. Technical Guidelines.....	47
D. Glossary of Terms (Reserved).....	



I. Introduction

The water resource is basic to all renewable resources and is fundamental to all life cycles. If this resource is not adequately considered, protected, and conserved through management, production of other dependent renewable resources will rapidly decline. Further, nonrenewable resource production is intimately tied to the protection and use of this resource. It is, therefore, absolutely essential that all decisions and actions of the Bureau of Land Management include consideration for the wise use and protection of this basic resource.

The purpose for developing a water management program is four-fold:

- *To provide guidance for the line manager in building water resource considerations into the land management program,*
- *To facilitate compliance with Federal laws, regulations, and executive orders dealing with the water resource.*
- *To give guidance to the field specialist (hydrologist) in fulfilling professional responsibilities, and*
- *To provide a sound basis for addressing the water resource, in fiscal program and project planning.*

Three definitions are needed at this point in order to ensure a common basis for understanding the ensuing portions of this document.



Hydrology is the science that treats the waters of the Earth, their occurrence, circulation, and distribution, their chemical and physical properties, and their reaction with their environment, including their relation to living things (Scientific Hydrology, 1962).

There are three broad problems in applying this natural science (hydrology): (1) The measurement, recording and publication of basic data; (2) The analysis of these data to develop and expand the fundamental theories and (3) The application of these theories and data to a multitude of practical problems. Hydrology is a broad science drawing on many related fields and basic natural sciences for many of its data and much of its theory. Applied hydrology, insofar as it relates to the Bureau of Land Management, is primarily concerned with the water resources of small drainage basins.

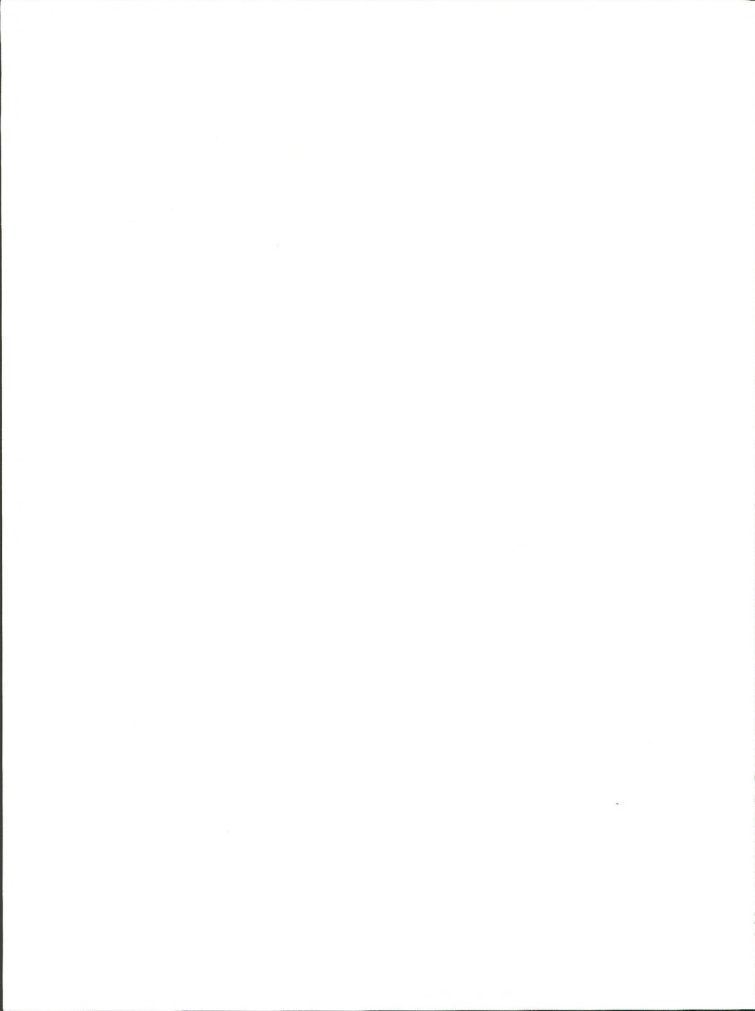
Watershed Management is essentially the management of the natural resources of a drainage basin for the production and protection of the water resource, including the control of erosion and floods, and the protection of esthetic values associated with water (Hewlett and Nutter, 1969).

Water Management is primarily concerned with relationships between management of soil and vegetation and the quality, quantity and timing of water production from watersheds as they affect both on-site and downstream use. This involves some kind of land use,

nonuse or modification of use, such as hydrographic modification, control of water pollution and stream or channel management, to meet management needs in prescribing optimum benefits.

This program is one component of the watershed program (4340) in the Bureau, as is depicted on the following diagram.

Objectives for the Water Management Program are followed by a definition of the role of this program in the total Bureau management framework.



WATERSHED (4340)

SOIL

AIR

WATER

GEOLOGY

VEGETATION

WATERSHED MEASURES
1. Rehabilitation
2. Management
3. Co op Programs
4. Surface Protection

HYDRO-METEROLOGY

WATER QUALITY

LEGISLATION
1. Compliance
2. Permits

WATER AVAILABILITY
1. Surface Water
2. Groundwater

WATER RIGHTS

SPECIAL STUDIES
1. EMRIA
2. Colorado River Salinity



II. Policies

Bureau policy requires that all watershed protection and management activities on public lands will be planned and administered with safeguards needed to attain the widest range of beneficial uses without unacceptable degradation of the environment, risk to the public health or safety or loss of public values. Since water has been identified as one of the basic resources upon which all other renewable resources are dependent for life and growth, and since all resource activities are committed to maintaining or enhancing these resources, the impact upon the water resource must be evaluated for any proposed management activity.

Therefore, it shall be the policy of the Bureau of Land Management in Wyoming to:

- A. Assure that multiple use and sustained yield, as they relate to the water resource, its quality and various uses, are basic goals and objectives for land use planning and management on BLM-administered lands (Ref. PL 94-579, Declaration of Policy).
- B. Protect, maintain, restore, and/or enhance the quality of water on all BLM-administered lands, through multiple-use resources management, so that its utility for dependent



ecosystems, including present and/or desired human environments, will be maintained equal to or above legal water quality criteria. Water quality limits are those defined by applicable laws and regulations.

Specifically, water quality monitoring* of land use activities shall be performed on all BLM-administered lands to assure that BLM management will protect or enhance quality of water on or passing through these lands (Ref. PL 94-579, Declaration of Policy, PL 92-500, EO 11514, EO 11752, and OMB Circular A-67).

- C. Assure that water resource data needed for basic, sound planning documents are collected and maintained. Historically, inventory and data needs have been directly premised upon case-by-case management problems and situations as they occurred. This kind of action is improper and inadequate due to the long-time, long-range aspects of water data collection and proper application to land use planning and resource management. Therefore, water resources information (data, interpretations and analyses) shall be incorporated into the Bureau planning system and reflected in all activity plans. Water resource inputs are to be in the form of predicted behavioral responses rather than simply technical and subtechnical facts.

*See Water Quality Monitoring Procedures in Appendix C.

D. Comply fully with the intent and objectives of the National Environmental Policy Act and other related laws, and support of Executive Orders and regulations. Environmental quality is intimately involved in all our resource programs. (See Appendix C for excerpts from laws pertaining to watershed management and their relation to BLM operations.)

This constitutes the guidelines by which the Wyoming Water Management Program will be conducted. This brings us to the objectives of the program.



III. Objectives

Managers need to have a clear understanding of how the quality and quantity of surface and subsurface waters may potentially be affected by their decisions. It is also essential that they understand the relationship of water to other dependent resource values, such as wildlife, recreation, range, etc.

The goal of the Water Management Program within the Watershed Program in Wyoming is to provide basic water resource information and management services, to implement scientific multiple resource planning and management and to maintain or enhance productivity and quality of the water resource. Within this framework, the major objectives are:

- A. Provide water resource information and hydrologic services to management in land use, program, and project planning so that Federal, State, and local water resource requirements are met or exceeded (PL 91-190, PL 92-500, EO 11752).
- B. Provide hydrologic skills for watershed inventories, plans, and management services, and interpret the water resource information to form the scientific base needed for watershed management decisions.
- C. Ensure the protection and preservation of water supply requirements for all BLM resource uses.



- D. Prepare and maintain an inventory of all water resources associated with public lands, and interpret water resource data in a manner that fulfills the needs of all Bureau programs and administration, including environmental assessment (PL 94-579).
- E. Ensure compliance with applicable Federal and State laws and regulations dealing with protecting the quantity and quality of the water resource for its intended use (EO 11514 and EO 5003).
- F. Coordinate the Bureau Water Management Program activities with Federal, State, and local agency representatives.
- G. Increase the understanding between staff specialists and resource managers of the application of water resource information.
- H. Provide training, formal as well as informal, for professional, technical, and management personnel.



IV. Roles

The Bureau of Land Management is responsible for the management of natural resources on approximately 17.8 million acres in the State of Wyoming, the largest amount of land under a single jurisdiction, and for the management of the Federal mineral estate underlying approximately 68% of the State's land area. A major part of this responsibility is the soil, water, and air management effort that must be oriented toward land management problems and opportunities. It must also be oriented to the numerous environmental concerns through conservation, protection, and enhancement practices.

This chapter describes the role of water resources within the overall operation of the Resource Management Program in Wyoming.

The Water Management Program consists of seven major tasks to be performed by hydrologic and watershed scientists (Note: the underlined portions indicate the role action):

- A. Water Management applies the science of hydrology and, insofar as it relates to BLM, is concerned primarily with the water resources of small to intermediate drainage basins. Several other disciplines, i.e., climatology, meteorology, geology, biology, chemistry, physics, soil science, mathematics and statistics, must be utilized in the application of water



resource management to land use and natural resource planning, program planning and project planning. This means a role of active participation in interdisciplinary environmental assessments and studies, unit resource analyses (URA), management framework planning (MFP), activity planning and on-site investigations.

- B. Water Resource Investigations are necessary to evaluate the hydrologic interactions on units of land. These constitute inventories of water quantity and quality information from which to evaluate management activities. This information is also used to predict the effects of proposed activities on the land resources. In general, the greatest benefit will be in providing interpretations for the existing environment and predictions of probable impacts.
- C. Disaster Surveys describe the kind and amount of damage sustained to watershed values as a result of fire, flood, or other disasters. The program should also identify action necessary to restore lost water resource values and practices that could eliminate or minimize future disasters.
- D. Water Quality Management involves formulating best management practices (BMP's) consistent with water quality objectives. This is accomplished through the Bureau Planning System (BPS)



and coordination with State water quality management planning and implementation. BMP development requires prerequisite information, which can best be provided by a water quality monitoring program.

- E. Small Watershed Studies are needed to evaluate land treatments and watershed component interrelationships. This often involves the study of cause and effect relationships between management practices and the water resource. These efforts will complement the activities of the water resource investigations and serve as a bridge between research and administration.

- F. Internal Coordination in the use and application of water resource information will be accomplished by "workshops" and "on-the-ground" instruction. Every effort will be made to transform technical data into understandable information for the user relative to the need. Land use and natural resource planners and decisionmakers need to be aware of the hazards and risks involved in use options of the land and its resources. They also need to be aware of legislation, Executive Orders, regulations, and policy pertaining to water resources as they apply to BLM programs.

Also, formal training of hydrologists and hydrologic technicians to maintain technical proficiency and to provide

training in the use of new techniques and instrumentation is necessary to assure continued quality performance of specific job elements established for their position.

- G. Coordination with other Bureau functions, other Federal, State, and local agencies, and research and industry representatives is a key function within the structure of the Water Management Program. The strategy is to achieve a unified approach to solving mutual problems, to identify opportunities for enhancement, improvement or protection of soil and water resources and to avoid duplication of effort.

Having defined the role that water management plays in the overall scheme of public land management, we will proceed with a discussion of the functional part of the program--program composition.



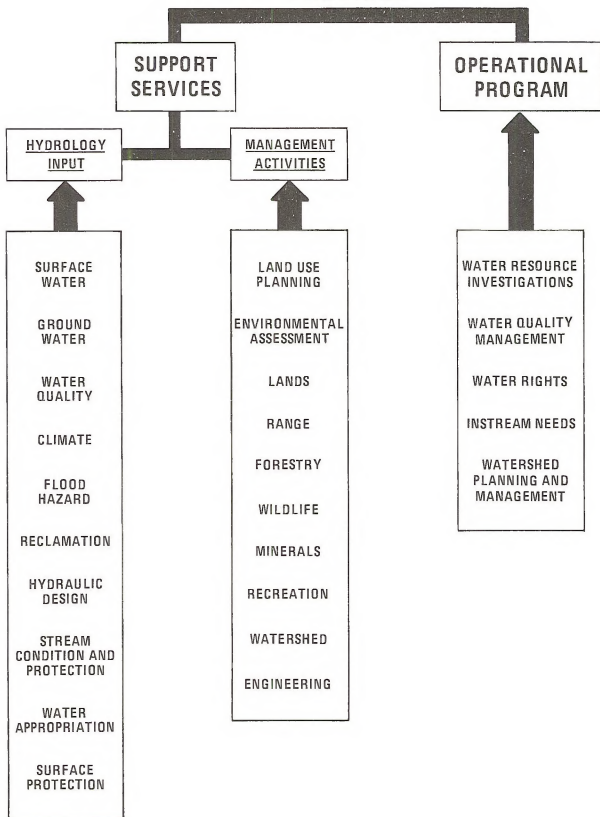
V. Program Composition

The Wyoming Water Management Program is composed of two parts, in harmony with the Bureau Watershed Program Thrust, approved March 17, 1977. The first part is that of support to all other Bureau activities (environmental planning and coordination, lands and realty, range, forestry, wildlife, minerals, recreation, engineering, fire and protection). This will generally constitute participation by the hydrologist to assist management in development and use of the resources in fulfillment of the activity goals.

The second portion is an operational one. The purpose of which is to maintain a basic data acquisition program and to utilize this resource information in support of programs and projects intended specifically for protection and enhancement of the water resource.

These program parts are illustrated in the following figure and discussed in more detail.

WYOMING WATER MANAGEMENT PROGRAM





A. Support Service to all Activities

One of the roles of the Watershed Program in Wyoming is that of providing a "consulting service" to the land manager. The Watershed Program is based on interpretation of scientific knowledge to provide management with a basis for making sound decisions and is the avenue by which water resource management contributes toward the implementation of these decisions.

Water Management Support services are the direct application of hydrologic knowledge to specific situations in present and proposed resource development and management programs. These services include advice, counsel and design of specific or local protection measures for definite project and activity objectives relating to water quality and quantity, timing of flows (both surface and subsurface), flood and debris control, soil erosion, sediment yields, channel stability, instream flow requirements, recreation use requirements and livestock and wildlife requirements. Also included is participation on interdisciplinary planning teams at all field levels.

Written documentation of support input will be developed by the hydrologist and presented to management. It is encouraged that the document take the form of an assistance or staff report.



if the input is not otherwise incorporated in a formal document such as an activity plan. See Appendix C, "Guidelines for Hydrology Staff Reports."

The following are examples of water resource input to the various Bureau programs:

(Note: Italicized portions indicate water resource and hydrologic inputs.)

1. Watershed

The objective of the Watershed Program is to provide soil and water resource data to all Bureau activities on public lands in the direction of two program thrusts: A service program to provide all Bureau activities with soil and water resource data and interpretations which will assist in management, development and use of their particular resources and programs; an operational program to design, develop, and implement on-the-ground programs and projects for the protection, enhancement and rehabilitation of the soil and water resources.

- a. *On-site investigations, interpretations and analysis to determine land capability, site potentials,*



hazards and risks, potential and magnitude of impacts and adverse effects, recommendations of feasible mitigating measures, and identification of water quality standards and monitoring needs in the development of watershed management plans.

- b. On-site evaluations and treatment recommendations for improvement or maintenance of the water resource values relating to fire rehabilitation.
- c. On-site investigations and evaluations for effects on water pollution (nonpoint source) involved in noxious weed control and the application of fertilizers.
- d. See Watershed Restoration and Maintenance section for further support items.

2. Forestry

The objective of the Forestry Program is to manage and harvest the forest resource in such a manner that existing stand conditions are maintained or improved by the application of management practices that are economically and ecologically feasible, consistent with environmental considerations necessary to ensure the protection of other resource values.

- a. *On-site investigations, interpretations and analyses to determine land capability, site potentials, hazards and risks, potential and magnitude of impacts and adverse effects, recommendations of feasible mitigating measures, and identification of water quality standards and monitoring needs in the development of timber management plans.*
- b. *Determination of the effect of timber harvesting on quality, timing, and volume of water flow.*
- c. *Prediction of peak flows and duration periods in relation to road construction improvements, or other surface disturbance; assistance in the development of recommendations on revegetation; assistance in the determination of drainage and other treatment practices; and monitoring for effects on water quality control.*
- d. *Determination of effects on downstream water quality caused from slash treatment, i.e., burning, scarification, etc.*
- e. *Determination of critical soil moisture periods in relation to reforestation proposals.*



3. Lands

The objective of the Lands Program is to administer the use, occupancy and development of the public lands through the existing public land laws and maintain records of these lands and uses. This includes, but is not limited to, making land available for needs of Federal, State, and local agencies and programs, as well as providing lands needed for agriculture, urban and suburban expansion, commercial and industrial development and recreation purposes.

- a. Identification of flood plains and areas susceptible to high water tables and flash flows.
- b. Determination of adequate water supply, both surface and subsurface, for agricultural uses in classifying land as suitable or not suitable for Desert Land Entry.
- c. Determination of use restrictions and stipulations in relation to water quantity and quality impacts resulting from land actions.
- d. Establishment of criteria for requirements in special use permits and/or mitigating measures for use authorizations requested by applicants.



4. Minerals

The objective of the Minerals Program is the production of minerals from the Federal mineral estate, including: facilitating timely and orderly development of the minerals resource; obtaining fair return for the mineral resource secured, as the law provides; and providing for protection of the environment associated with the mineral development. Many of the water resource concerns are being addressed by the Energy Minerals Rehabilitation Inventory and Analysis (EMRIA) effort.

- a. *Determination of impacts of proposed mineral development activities and recommendations for mitigating measures with respect to: surface and subsurface flow patterns, stream channel geometry, change in aquifer characteristics, and surface and subsurface water quality.*
- b. *Location of potential water sources for use in mineral development and processing.*
- c. *Determination of water requirements for reclamation.*
- d. *Review of reclamation recommendations for resource protection and management in the development of locatable, salable and leasable minerals.*

- e. Recommendations for lease stipulations covering operational quality control, mine and mineral processing, waste disposal and monitoring.

5. Range

The objectives of the Range Program are inventory, evaluation, and management of the range resource on public lands as used by domestic livestock and wild horses and burros.

This is accomplished by authorizing and supervising grazing use, developing, maintaining and supporting livestock management facilities, and protecting the attendant resource.

- a. On-site investigations, interpretations and analyses used to determine land capability, site potential and productivity, hazards and risks, identification of water quality standards and monitoring needs, identification of impacts and adverse effects and recommendations of feasible mitigating measures and estimated effectiveness are water inputs in the development of allotment management plans.
- b. Determination of the potential for, and quality of, required water to be used in development of Allotment Management Plans and grazing systems.
- c. Collection and interpretation of climatological information as it pertains to site productivity.



- d. Assistance in determining the affect of livestock use on water quality, water yield, timing, and runoff peaks, both on-site and off-site.
- e. Determine those water resource impacts attributable to grazing, as opposed to the natural, geologic processes of the area.

6. Wildlife

The objective of the Wildlife Program is to protect, manage and improve wildlife habitats on public lands to: provide habitats of sufficient quality and quantity to support an optimum diversity of wildlife species and population levels within habitat capabilities; and be consistent with multiple-use management and public demand, use and benefits.

- a. On-site investigations, interpretations and analyses to determine land capability and sustained carrying capacity and treatment needs to protect water resource values in the development of habitat management plans.
- b. Determination of the potential for, and quality of, water resources for habitat improvement. Interpretations and analyses apply to needed mitigating measures if site disturbances are involved.



- c. *Determination of chemical water quality for terrestrial and aquatic flora and fauna.*
- d. *Quantification of instream flow requirements for terrestrial and aquatic flora and fauna.*

7. Recreation

The objectives of the Recreation Program are to manage recreational needs on public lands, recognize and protect associated cultural, visual and natural historic values.

- a. *Identification of land use/management activities effects on recreational waters (both body contact and potable).*
- b. *Monitoring water quality for recreational use both on-site and downstream.*
- c. *Recommendations in developing criteria for recreational water quality management.*
- d. *Identification of water resources for recreational use (both body contact and potable), including flood hazard potential and risk factors.*
- e. *Providing water resource inventory, analyses and interpretations: to determine site potential, land capability and the identification of hazards and risks for protection recommendations of critical*



areas; in suitability studies for wilderness area classification; and in planning for wild and scenic river studies.

The objectives of the Cultural Resource Management Component are to inventory, evaluate and protect significant cultural resources on public lands.

- a. Provide historical hydrologic information to assist in interpretation of depositional differences.

8. Engineering

- a. Quantification of hydrologic data, interpretations, and application criteria essential to the construction of reservoirs, water facilities, roads, recreation facilities, and buildings.

9. Emergency Rehabilitation

- a. Quantification of hydrologic data, interpretations, and application criteria essential to the rehabilitation of flood and fire damage.
- b. Location of flood plains and areas susceptible to flooding.

B. Activity Operation

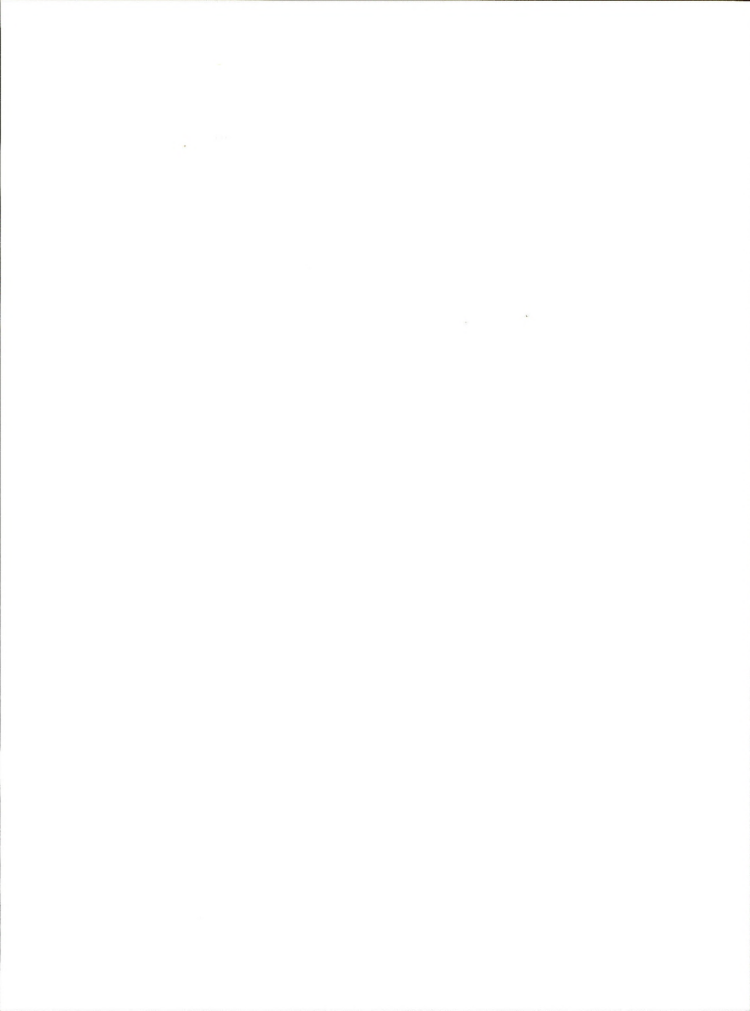
The cornerstone to future development in the arid west is an adequate supply of quality water. Development of conventional



energy (coal, oil and gas) and the associated industrial agriculture, and recreational developments on public lands are all ultimately dependent on the quantity and quality of natural waters. A large percentage of the water either originates on or cross BLM-administered lands. Thus, the Bureau's activities on these lands have quantifiable effects on these waters.

The second phase of the program, activity operations, is directed toward determining the available quantities of quality water and the protection, enhancement, and minimized adverse effects to the water resource affected by Bureau activities and vice versa. Each Bureau activity draws on this data bank, and through use of this derived information, sound land management decisions are formed. Also, it is a fundamental requirement for the support service discussed in the previous chapter.

To accomplish the goals and objectives of the Water Management Program, a systematic determination of statewide water quantity and quality, as it relates to BLM activities, must be made. The operational phase assures this accomplishment. Thus, each District will conduct the following investigations:



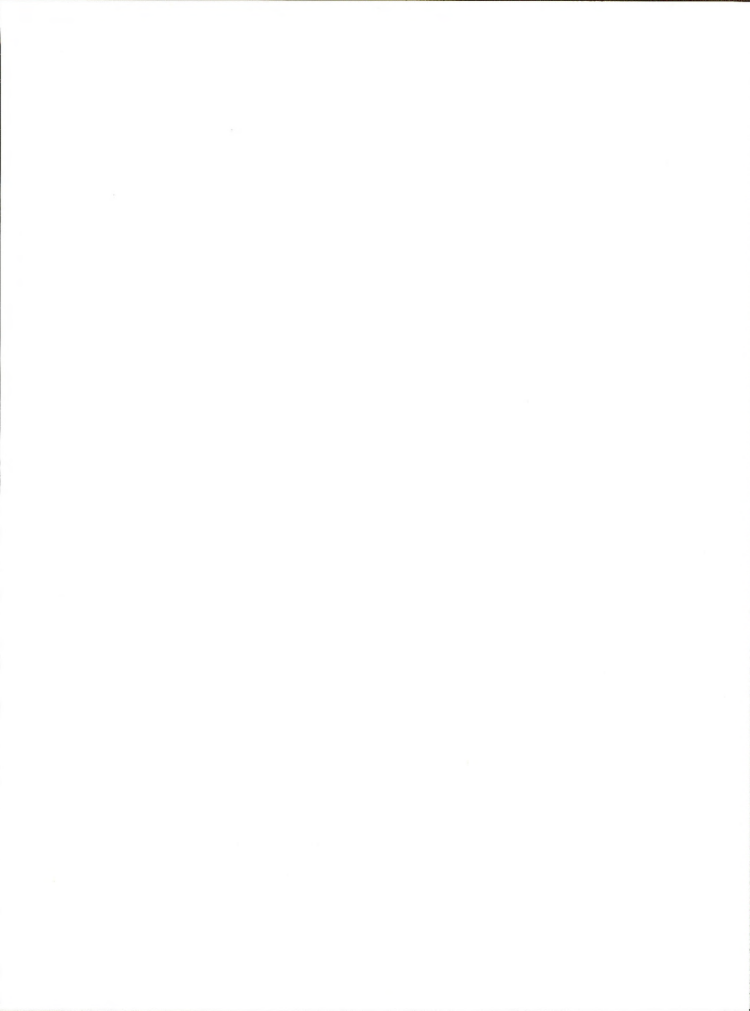
- A detailed inventory of available water quantity.
- An inventory of drainage basin water quality, and its relationship to land management activities.
- An investigation of the current water allocations.
- A watershed reclamation, stabilization and improvement program.
- An inventory of channel stability.

This phase of the program, thus, will include the following activities:

1. Water Management and the Bureau Planning System

The first requirement of the Water Management Program is to provide a continuing basic inventory and data base of the water resource for the planning system that can be drawn upon by all other activities in planning and development needs.

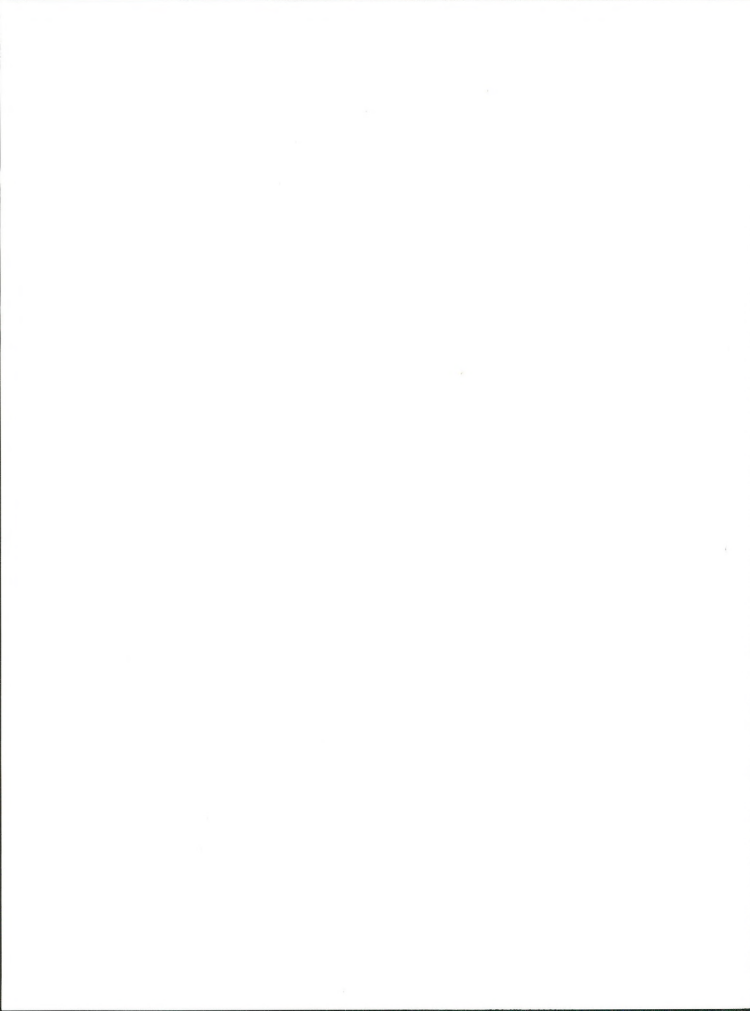
This inventory is the information source for Step 2 and 3 of the Unit Resource Analysis (URA). The initial planning system use of this "data base" is in identifying technically feasible alternative potentials for development and/or protection in Step 4 URA by all activities,



including water resources. The information is then combined with social, economic, legislative and policy concerns in an evaluation of Step 4 URA to determine which of those alternatives or combinations should become program management recommendations (Step 1, Management Framework Plan). The third planning system application of this "data base" is made in applying it to ecological concerns in constructing the ecological profile. These elements are then input to management recommendations and decisions (Step 2 and 3, MFP). Refer to BLM Manual Sections 1605 to 1608.

As quantity and quality of water resources inventory and data increases, and as monitoring of the water resource produces more information on its effects upon the other activities or the effects of other activities upon the water resources, the "data base" should become more reliable and dependable as it is recycled through the planning system/management implementation process.

The mechanism for handling this "data base" will primarily be the Water Resources Research Institute's "Water Resource Data System," located at the University of Wyoming. It should be noted, however, that the Bureau, under the "Strategic Information Plan," is developing a



total resource computerized data storage and retrieval system. This system, when it becomes operational, and other systems such as WATSTOR (USGS) or STORET (EPA) will be utilized where their data and capabilities provide additional support. The source for this "data base" is discussed under the next element.

2. Water Resources Investigations

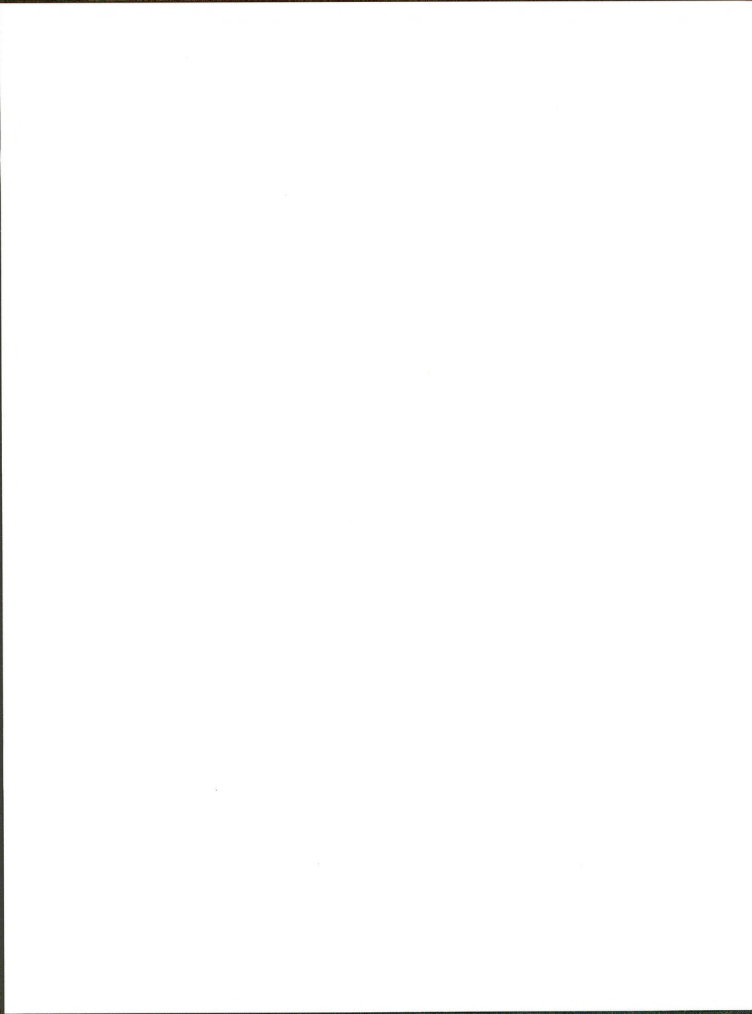
Water resources investigations provide the basic data used in determining water yield (quantity, timing) and to identify, characterize and evaluate water quality conditions, problems and potential change. These investigations include the determination of associated watershed conditions, stream channel stability classifications, and water quality and quantity potential. These investigations are project oriented, requiring year-round continuity for reliable, quality data.

BLM will continue to use the services of U.S. Geological Survey as the principal source of surface and subsurface hydrologic data as it is responsible for coordinating water activities of all Federal agencies (OMB Circular A-67). EPA, USGS, and various State agencies will continue to be the principal sources of water quality data. The

Bureau of Land Management's role will be in the identification of what, where, and when data are needed, interpretation of these data, and the development of data collection studies including actual data collection by Bureau personnel when necessary. BLM must attain a technical capability to be responsive to land use planning and activity needs in a timely fashion.

There are three broad water resource categories on which investigations are needed. Information gathered will be used for the derivation of valid and flexible land use management guidelines:

- Surface Water: The quantity, quality, distribution, and timing of water flow (overland flow as well as channel flow) regulate man's use of the land. Knowledge of these flows is required to predict hazards and determine land use limitations as well as land use potentials.
- Ground Water: Knowledge of the quality and availability of subsurface water is required in order to determine what effects existing and proposed land uses will or can have on future water resources.
- Climatological Investigations: A knowledge of precipitation timing, distribution, form, intensity, duration, and frequency is essential in understanding the availability



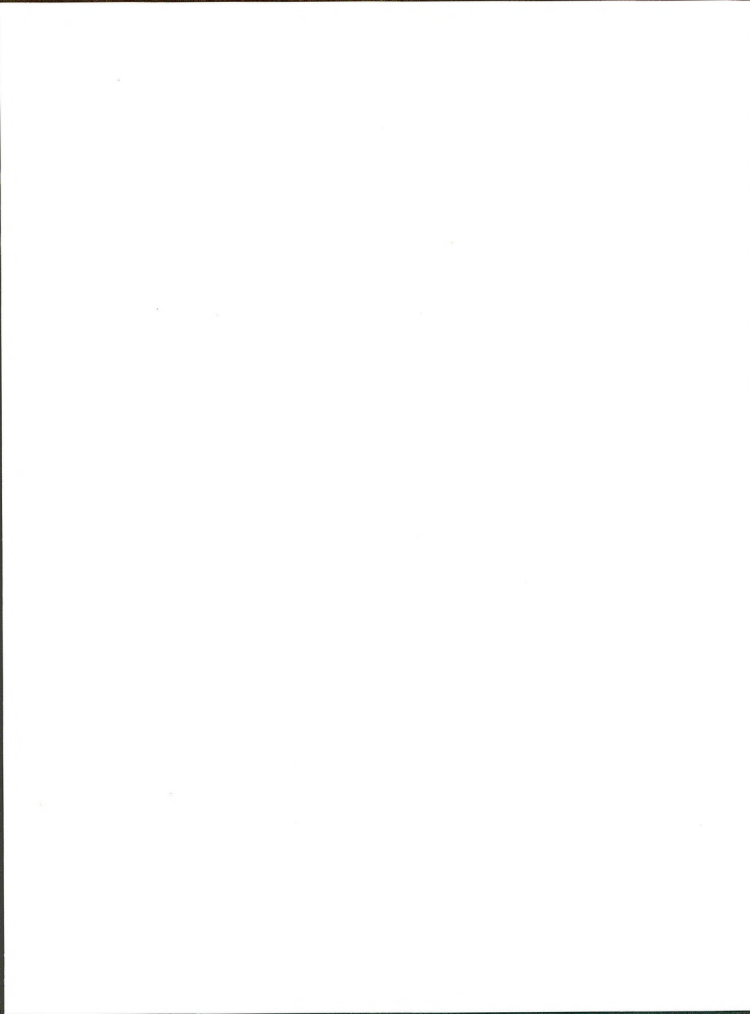
of water to plants and to the surface and ground water systems. In addition, air temperature, evaporation potential, wind movement, and other variables are important factors in climatological investigations.

In essence, there are three types of investigations used in Water Management:

a. Reconnaissance Hydrologic Surveys:

These are low intensity hydrologic surveys used to approximate the physical profile of the present water resource and of its potentials. These surveys will be made on all BLM-administered watersheds not listed for comprehensive hydrologic analysis (described later). These surveys are conducted at two levels. Level I is used for State, District, and river basin planning. This survey is based on the analysis of available data from which very broad interpretations and applications are made. Level I can be considered as a first approximation.

Level II is used in planning unit analysis. This level of survey is based largely on the analysis of available data supported by short term, low intensity field sampling. Elements of this survey include: intermittent grab sampling for water quality,

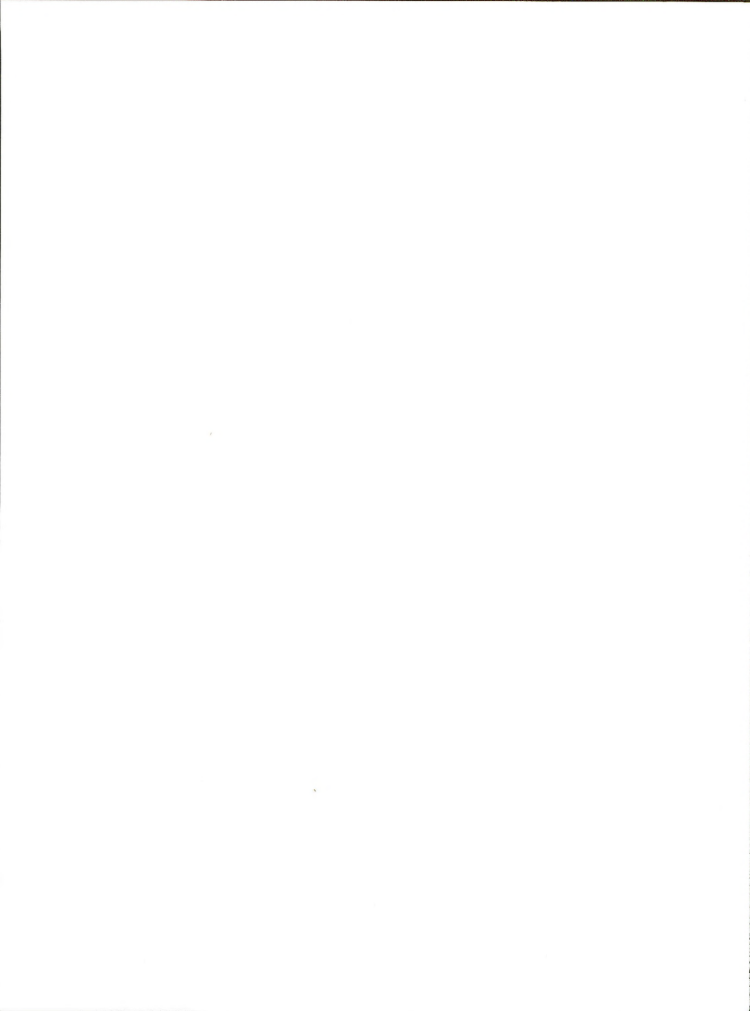


miscellaneous flow measurements, short term climatic data, stream condition surveys and compilation of existing hydrologic studies. This level can be considered the second approximation.

Neither Level I nor Level II lead to specific water resource prescriptions, but both can be used to develop water resource objectives or to provide general data on water availability, characteristics, behavior, and use in connection with other resource and District programs at the same levels, including water resource development programs of other agencies.

b. Long Term Data Network:

This would entail hydrologic monitoring to a much greater degree of sophistication and accuracy than suggested in "a" above. However, reconnaissance survey information is necessary input to designing this data network. The primary purpose of this network is to provide quantitative data necessary in characterizing drainage basins at an intensity needed to assist management in determining water resource planning, development, protection, and enhancement practices.



c. Surveillance and Monitoring:

These are specialized investigations of the water resources affected by management activities, by natural phenomena, and other periodic determinations of the current status of climatic and water conditions. It includes investigations, collections, instrumentation, processing, and analysis of data on a continuing basis. The parameters may include on-site erosion, sedimentation, soil moisture and temperature, runoff, suspended sediment discharge, stream bedloads, wind speed/direction, air and water temperatures, biological status of water, and related variables.

3. Water Quality:

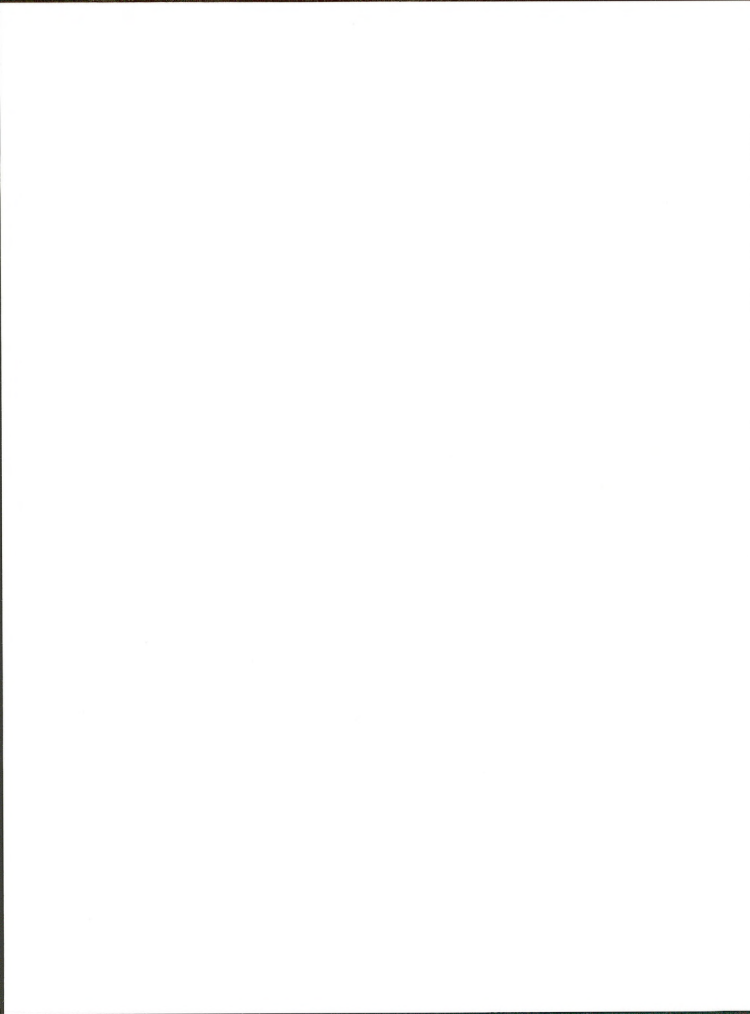
The water resource investigations discussed above should generate a data base essential for managing water quality. However, this component of the program goes far beyond acquisition of baseline information. National legislation provides the framework for our job in Water Quality Management.

The Federal Water Pollution Control Act, as amended 1972 (PL 92-500), requires the elimination of pollutant discharge into navigable waters of the U. S. by 1985, and

the attainment of a water quality suitable for fish, wildlife, and recreation by 1988. Section 313 and EO 11752 require Federal agencies to comply with Federal, State, interstate, and local requirements respecting control and abatement of pollution. Section 208 requires Federal agency cooperation with States in developing water pollution control plans for nonpoint as well as point sources of pollution. Section 404 requires that a permit be obtained from the Corps of Engineers for dredging or placing fill material in navigable waters of the U.S. This Act and its amendments will have considerable effect on water and related activities of the Bureau.

Water quality problems, interest, and concerns are not restricted to surface waters alone. The chemical constituents and pollutants in ground water are also becoming more important to land use planning. Other important issues are possible pollution from geothermal steam, deep-well injection of solid and liquid wastes, and change in recharge or discharge zones caused by aquifer depletion.

The Water Management Program must include participation with Federal, State, and local agencies in water quality management planning and in formulation of rules and regulations attendant thereto. Examples of involvement efforts include:



- a. *Serving in an advisory capacity in PL 92-500, Section 208 planning efforts, ensuring that Bureau planning and policy are incorporated in the State water quality management plans.*
- b. *Assuming the lead role in implementation of PL 92-500, Section 208 plans on BLM-administered lands.*
- c. *Working with the Corps of Engineers in development of PL 92-500, Section 404 general permits where they pertain to BLM administration.*
- d. *Taking measures to ensure that BLM management and development practices are in line with the National Water Quality goals of 1983 and 1985. In some cases this may involve instituting restoration/rehabilitation measures in the near future in order to achieve acceptable improvement in water quality by the target date.*
- e. *Providing assistance to the resource activity managers with regard to our compliance with water quality permit procedures.*
- f. *Providing input to review of water quality permit applications by other parties where their activities may affect water quality on BLM administered land.*



4. Water Uses and Rights

The State of Wyoming has jurisdiction over allocation of all waters of the State. The Water Management Program must ensure that water is available to serve dependent resource needs as they are identified in Bureau programs. This involves the planning and accomplishment of work necessary to obtain the legal rights and reservations to both surface and sub-surface waters for development, use and management of the resources on public lands.

5. Instream Flow Needs

Certain water dependent resource values (terrestrial and aquatic flora and fauna) as well as the quality of water itself require certain minimum flows or conservation pools for maintenance. Serious depletion of flows or pools in the surface water system could destroy certain valuable terrestrial and aquatic habitat and cause unacceptable levels of pollutant concentration.

It is an important and essential concern of the Water Management Program to: (1) *identify minimum instream flow and conservation pool requirements*, and (2) *provide for those needs through proper land management, where possible.*



6. Watershed Rehabilitation and Maintenance

The BLM watershed program in the late 1950's and up to the mid-1960's consisted of water control practices with a minimum of range improvement work. Many large detentions, diversions, and dike systems were designed and constructed. At that time, it was felt that large structures were the answer to reducing sediment discharge to the stream network. Ideas began to change in the mid-1960's and water control structures gave way to AMPs and range management concepts. This concept continued until FY 1976 when the annual work plan (AWP) reflected a new definition of the watershed subactivity. Project work primarily in support of the range program was shifted to that program. The new watershed program, thus, will place major emphasis on the protection and enhancement of the soil, water, and air resources. That message is spelled out clearly in the Bureau "Watershed Program Thrust," March 1977.

This component of the program calls for water resource (hydrology) input to Watershed Program planning and management. This generally involves an interdisciplinary team effort (hydrologist, soil scientist, vegetative specialist, watershed specialist, etc.) and would include the following activities:



- a. Conduct of watershed inventories which include such components as susceptibility to sheet erosion, vegetative cover condition, stream channel condition, bank vegetation and sediment yield.
- b. Preparation of watershed activity plans intended to rehabilitate degraded watershed values resulting from overuse, fire or other natural disaster. This includes: evaluating values lost and opportunities for enhancement; recommending treatments, such as contour furrowing, deferred use, fertilization, seeding, water spreading, sediment entrapment, or snow management; and recommending the best treatment in view of resource potential and benefit/cost analysis.
- c. Providing input to design of watershed projects for rehabilitation or development, such as treatments suggested above, detention structures, ground water development or water distribution systems.
- d. Monitoring watershed management practices and being prepared to recommend modification of these practices if the watershed in question is experiencing deterioration of water resource values.



- e. Rehabilitation work to stabilize soil and prevent further on-site damage caused from abandoned roads, reservoirs, and other features.
- f. Input to decisions regarding maintenance needed to maintain existing land treatments, structural measures and other watershed works of improvement at a fully effective level. This generally is repetitive work, including such things as maintenance of structures, replanting, stream channel clearing, aquatic flora and fauna control, and noxious weed control.

VI. Responsibilities

Any program, to be successful, must have a clear definition of responsibility at each organizational level. The responsibilities for the Water Management Program are assigned as follows:

- A. The State Director, through the Division of Resources, will:
1. Establish the technical leadership, supervision, guidance and functional evaluation for the Water Management Program to assure a unified statewide approach.
 2. Provide the District Managers with up-to-date interpretations of Departmental and Bureau policy and Federal and State legislation as they pertain to water resources.
 3. Coordinate the Water Management Program within the overall Watershed Program and with other resource and planning programs, in terms of funding and program priorities.
 4. Annually (before AWP preparation) review all District Water Management Programs for quality control and AWP input.
 5. Prepare AWP directives and program emphasis statement for the State at the beginning of each fiscal year.
 6. Coordinate water resources studies and investigations between Districts and neighboring States and other State and Federal agencies.

7. Coordinate storage and retrieval of Bureau generated water resource data.
 8. Provide centralized support in areas, such as computer services, interagency agreements, and cooperative programs.
 9. Ensure that water resources data are acquired and interpreted consistent with accepted technical standards.
 10. Ensure technical adequacy of planning documents with implementation programs.
 11. Provide training opportunities for the field specialists.
 12. Ensure statewide compliance with Bureau policy, legislative requirements, and executive orders pertaining to water resources.
 13. Advise the Districts on selection of specialist personnel for filling vacancies or program expansion.
 14. Formulate water rights policy and communicate with the State Engineer and the Field Solicitor in water rights matters.
- B. The District Manager, through the Division of Resources, will:
1. Establish a District Water Management Program to be in harmony with the State program, but specific to needs and concerns of the District.



2. Annually review and modify that program in light of new policy, legislation, and AWP directives.
3. Implement and maintain the Water Management Program as outlined by this document.

VII. Summary

The Water Management Program, as developed and documented here, is intended to provide guidance for the land managers and field specialists in order that water management will be properly considered in Bureau program planning and implementation. This program involves the application of the science of hydrology as a component of the BLM watershed activity. It concerns itself technically with water availability and quality, watershed characteristics, climate, water legislation, water rights, and special studies designed to support all Bureau activities.

The objectives of the program are to inventory the resource, provide information and analyses on the resource to management, to ensure BLM compliance with applicable laws, coordinate BLM water related activities with other groups and agencies, and to foster an understanding of the importance of water resource considerations. The Water Management Program has a definite and discernible role in the Resource Management Program of Wyoming.

A series of policy statements were set forth with the intent of giving definite direction to the Water Management Program.

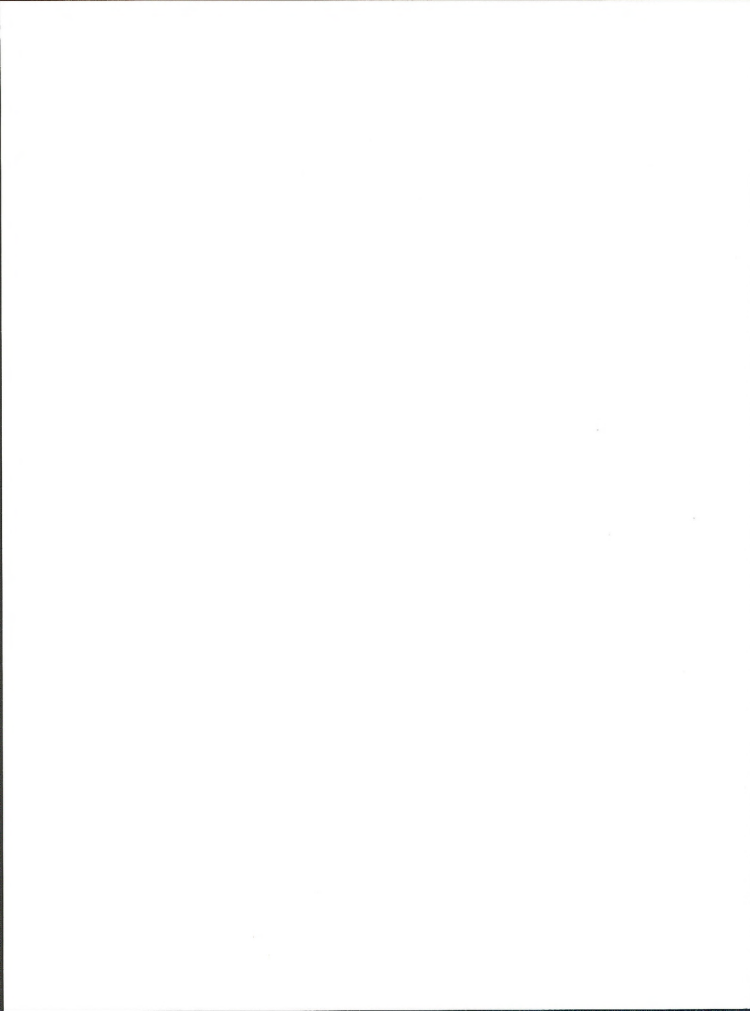


For purposes of describing the implementation of the program, it was divided into two components. First is the support role that water resources, through professional input of staff hydrologists, has to the various activities. This input involves interaction with other resource specialists to provide water management considerations in their programs. The second component is an operational one which will involve the acquisition of basic resource data; the conduct of water management programs, such as water quality management and team member participation in the watershed program, such as watershed inventory and activity planning.

Finally, specific responsibilities for carrying out the Water Management Program are assigned to both the State and District organizational levels.

This concludes the body of the Water Management Program. While the elements of the basic program are not expected to change significantly with time, the appendices are dynamic--subject to periodic revision and expansion. They include, but are not limited to:

- A. Current Program Directives (reserved)
- B. District Water Management Programs (as adopted)
- C. Technical Guidelines
 - Excerpts from major legislation pertaining to watershed management. (reserved)



- Water Quality Monitoring Procedures (reserved)
- Ground Water Investigation Procedures (reserved)
- Climatological Data Network (reserved)
- Small Basin Modeling Procedures (reserved)
- Bureau Planning System (reserved)
- Surface Protection (reserved)
 - a. Roads
 - b. Mineral Exploration & Development (except oil and gas).
 - c. Oil and Gas Exploration & Development.
- Snow Management (reserved)
- Energy Minerals Water Resource Studies - EMRIA (reserved)
- Mined Land Rehabilitation Guidelines (reserved)
- Computer Data Storage and Retrieval Systems (reserved)
- Guidelines for Hydrology Staff Reports
- District Organization Functional Responsibilities
- Instruction Memoranda

D. Glossary of Terms (reserved)



VIII. References Cited

- 1) "Scientific Hydrology," Federal Council for Science and Technology, June 1962.
- 2) Hewlett and Nutter, 1969. An Outline of Forest Hydrology



IX. Appendices

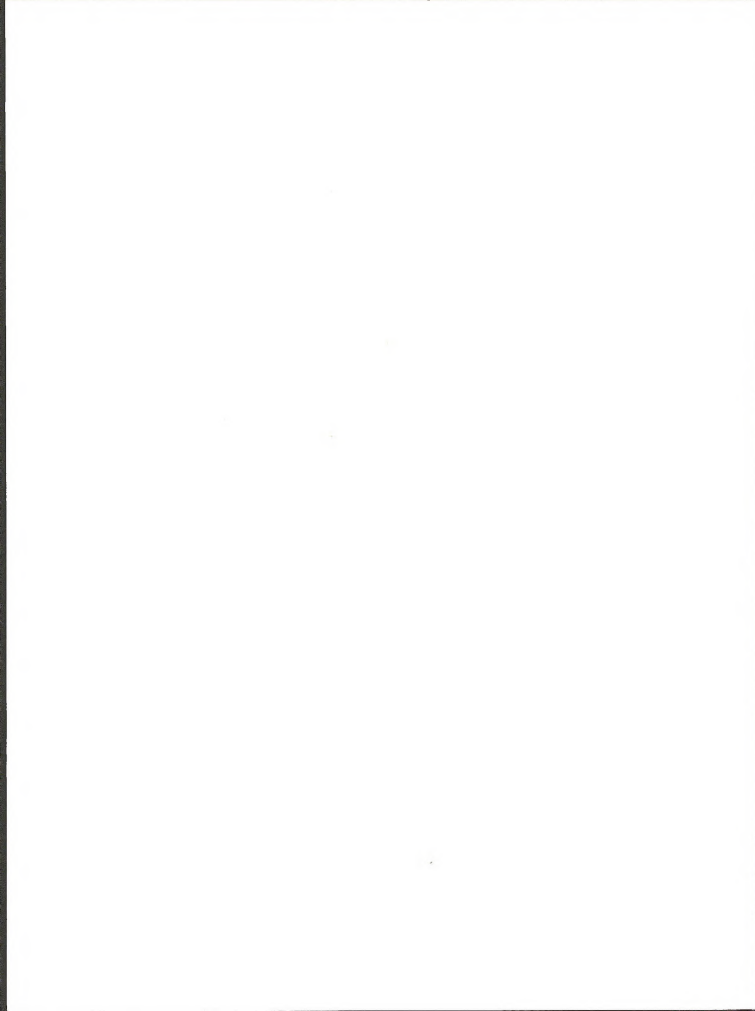
- A. Current Program Directives.
- B. District Water Management Programs.
- C. Technical Guidelines.
- D. Glossary of Terms.



APPENDIX "C"

Technical Guidelines

1. Guidelines for Hydrology Staff Reports
2. District Organization Functional Responsibilities
3. Instruction Memoranda



1. Guidelines for Hydrology Staff Reports

To meet Bureau of Land Management directives and policy that establish both quantity and quality goals, basic hydrologic inputs must be provided for all resource development and management programs, and land use and functional planning. This input may consist of an assistance or staff report developed by the hydrologist and presented to management. It should contain, but not be limited to, the following elements where applicable.

- An on-site investigation characterizing the present water resource.
- A description of the problem where and when it occurred.
- An assessment and identification of watershed (water resource) quality standards and tolerance levels based on the resource situation.
- The quantified identification of impacts and adverse effects of the proposed activity on watershed (water resource) values.
- The identification of site potential to meet planned objectives.
- The identified feasible mitigating measures and the expected effectiveness of maintaining quality within acceptable tolerance levels.

- A prediction of risk regarding the proposed action with the selected mitigating measures.
- An interpretation or analysis from water resource investigations and/or data.
- A recommendation prescribing:
 - (1) New or additional data requirements.
 - (2) Necessary funds and manpower.
 - (3) On-site work necessary to achieve mitigating measures.
 - (4) Guidance measures needed to avoid similar problems in the future.
 - (5) Incorporation into planning system update.



2. District Organization Functional Responsibilities

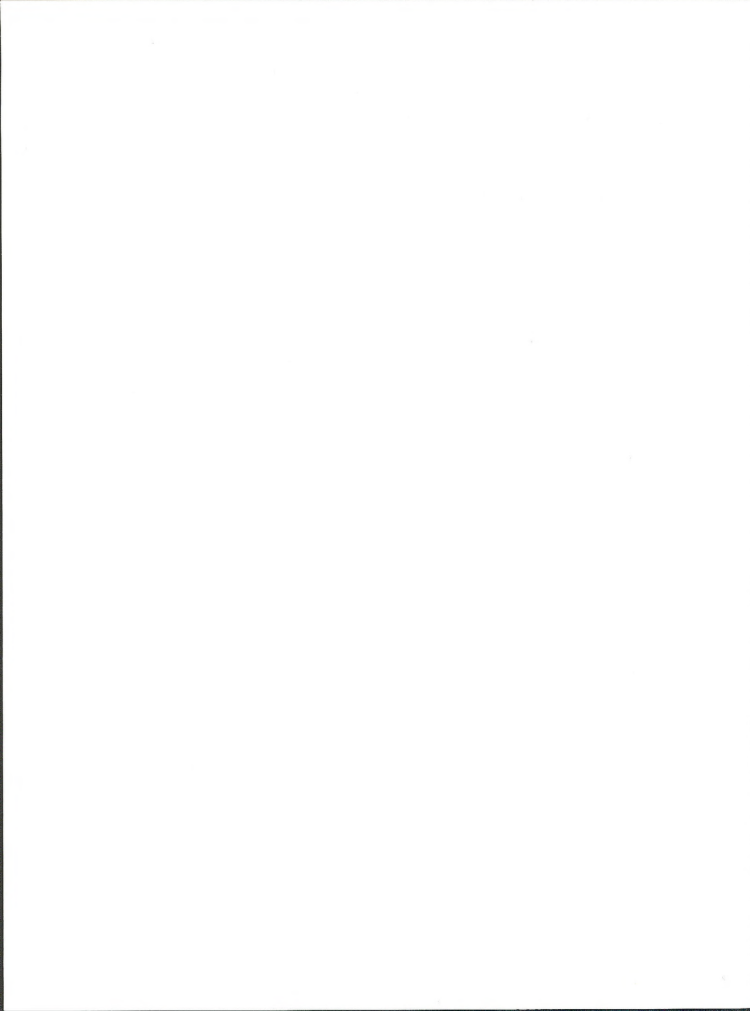
The District Manager is responsible for, and the implementation of, Bureau programs within the limits of regulations and directional and procedural guidance. He is directly accountable to the State Director as provided in BLM Manual Section 1213.37. The delegation of functional responsibilities in the District organization is a major necessity in the establishment of a Water Management Program. To assure a unified Districtwide program, with a quality data base, all water related items requiring technical guidance need to be the assigned responsibility of one individual, such as the District hydrologist. These responsibilities should become part of the individual's position description and be reflected in his specific job elements.

The assigned responsibilities should be as follows:

I. Division of Resources

A. Branch of Resources and Planning Coordination

1. District hydrologist (GS 9/11/12). Responsible for water rights, water quality inventory and analyses, water standards and criteria, technical advisory, URA/MFP, data collection procedures, AWP, training requirements, etc. He has technical supervision responsibilities of all water oriented personnel,



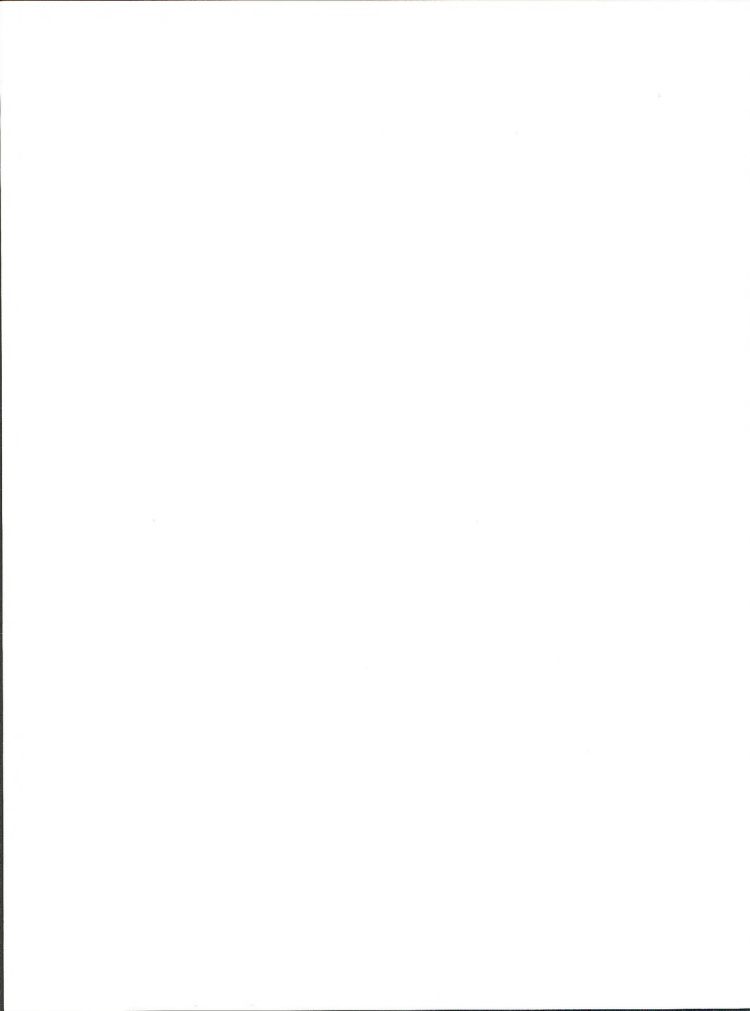
except the environmental analysis staff hydrologist. He provides data interpretations and recommendations for all water related surface protection activities, etc.

- a. Assistant District hydrologist (field, if warranted). Responsible for the conduct of field inventories and data collection subject to District hydrologist specifications. He assists the District hydrologist in his overall duties. He supervises hydrologic technician with the help of the District hydrologist.

- (1) Hydrologic Technician. This is a field technician for water resource data collection; may be summer temporary in some cases. He works directly for the field hydrologist.

B. Branch of Environmental Analysis

1. ES hydrologist (if warranted). Works with the District hydrologist for analyses procedures, data availability, inventories required, etc. He is responsible for all EAR's, ES's; relying on Branch of Resources and Planning Coordination water resource staff for data and analyses guidelines.



II. Area Manager

- A. Watershed specialist. Responsible for coordination of the 4340 subactivity and conduct of watershed inventories. He requests water resources inventories and data analysis as necessary (data and analysis developed by District staff hydrologist). This could be filled by a beginning hydrologist, soil scientist, or natural resource specialist.



3. Instruction Memoranda

- A. WSO-75-46 - Use of Field Chemical Kits for Water Quality Monitoring
- B. WY-76-63 - Waste Water Discharge Public Notice
- C. 76-454 - Assignment of Lead Responsibility for WRC, EPA, and COE Programs which have been Handled Jointly by Watershed and Environmental and Planning Coordination.





United States Department of the Interior

IN REPLY REFER TO

7152 (932)

BUREAU OF LAND MANAGEMENT

State Office
P. O. Box 1828
Cheyenne, Wyoming 82001

DEC 22 1975

Instruction Memorandum No. WSO 75-46

Expires: 6/30/76

To: District Managers

From: State Director, Wyoming

Subject: Use of Field Chemical Test Kits for Water Quality Monitoring

Attached is a copy of IM No. DSC 75-139, dated December 9, 1975, discussing the use and the utility of field type chemical kits for water quality monitoring, specifically the Hach Chemical Company products.

In essence, at the present time the Hach Company kits, and in general all field kits, do not meet Environmental Protection Agency standards established for compliance monitoring of effluent permits nor data input to EPA's STORET system.

All future water quality monitoring will be accomplished by sample analysis through a competent laboratory rather than by field kits.

Questions regarding the use of field kits or analytical techniques which meet compliance standards can be directed to Richard McQuisten, WSO 932; or Dale Hoffman, DSC-350, phone no. 303-234-2374.

Enclosure

Distribution:
Director (412) 2
Director (350) 1
DSC (D-700) 2
DSC (D-350) 1
Div. of Res., WSO 3
Tech. Serv., WSO 1
CF 3





United States Department of the Interior

IN REPLY REFER TO

7318 (932)

BUREAU OF LAND MANAGEMENT

State Office

P. O. Box 1828

Cheyenne, Wyoming 82001

November 22, 1976

Instruction Memo WY 76-63

Expires ~~6/30/77~~ 12/31/77

To: District Managers

From: State Director, Wyoming

Subject: Waste Water Discharge Public Notice

The State of Wyoming's Public Notices of Intent to Issue Waste Water Discharge Permits are to be responded to by the districts. A negative or no comment response is necessary.

Respond by submitting Form WY 7318-1 (forms attached) directly to the Department of Environmental Quality, Water Division, Hathaway Building, Cheyenne, Wyoming 82001. Please send a copy of your response to the State Director (932).

In the future, you will receive the Public Notice of Intent directly from DEQ, State of Wyoming.

Enclosure

Distribution

WO (412)	- 2 (w/2 encl.)
DSC (D-531)	- 3 (w/3 encl.)
WSO CF	- 2 (w/2 encl.)



Save Energy and You Serve America!



IN REPLY REFER TO

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

WASTE WATER DISCHARGE
PUBLIC NOTICE RESPONSE

After reviewing the State of Wyoming's Public Notice of Intent to Issue
Waste Water Discharge Permits, dated _____,
District has:

No Comments _____

Objection to permit _____

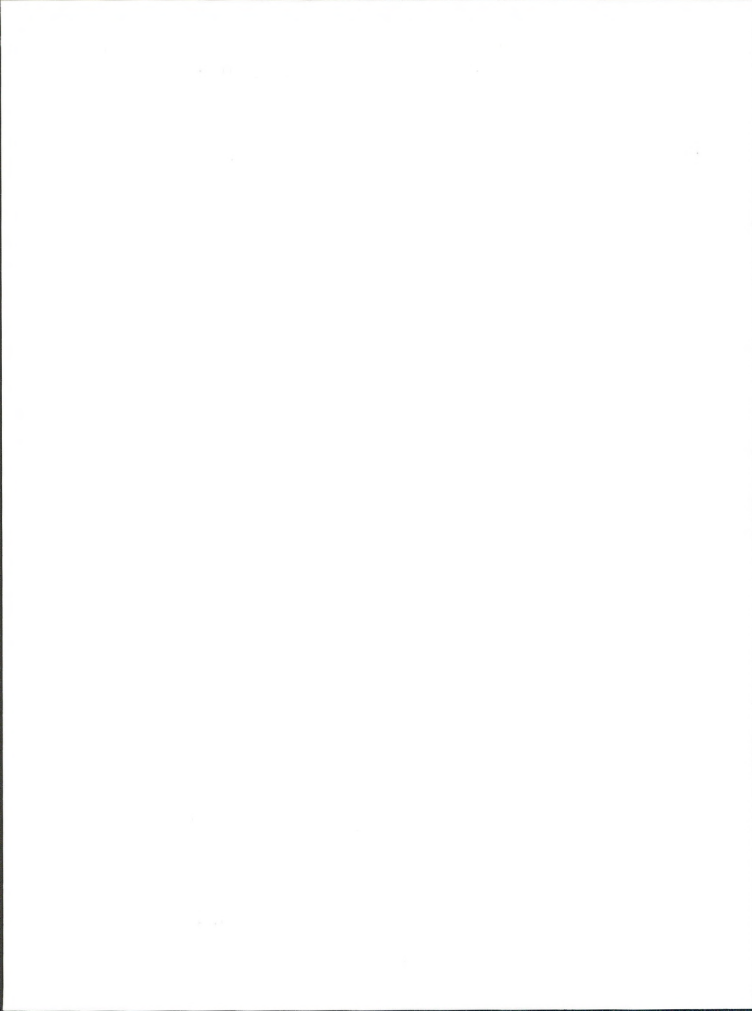
Comments:

District Manager



WY 7318-1 (Nov. 1976)

Save Energy and You Serve America!



INSTRUCTIONS

1. Submit one completed copy to:

Dept. of Environmental Quality
Water Division
Hathaway Building
Cheyenne, Wyoming 82001

2. Submit one completed copy to:

State Director (932)
Bureau of Land Management
Wyoming State Office
Box 1828
Cheyenne, WY 82001



IN REPLY REFER TO:

1790 (220)

7150 (350)

United States Department of the Interior

BUREAU OF LAND MANAGEMENT

WASHINGTON, D.C. 20240

August 25, 1976

Instruction Memorandum No. 76-454

Expires: 6/30/77

To: Directorate, Division Chiefs, and AFO's

From: Associate Director

Subject: Assignment of Lead Responsibility for Water Resources Council (WRC), Environmental Protection Agency (EPA), and U.S. Army Corps of Engineers (COE) Programs Which Have Been Handled Jointly by Watershed (350) and Environmental and Planning Coordination (220)

The basic criterion we followed in making these lead assignments is to have Environmental and Planning Coordination (E&PC) lead when the principal focus is planning or interagency planning coordination management. Watershed is designated lead when the principal focus is program implementation and/or related primarily to technical or policy aspects of air or water.

On the basis of the above described criterion, the following lead assignments are made:

Program	Lead
1. WRC general contact and liaison	Watershed
2. WRC Principles and Standards	Watershed
3. WRC National Water Assessment	E&PC
4. WRC Levels A, B, and C River Basin Studies	E&PC
5. WRC Technical Committees	Watershed
6. Overall Implementation of the Federal Water Pollution Control Act Amendment (PL 92-500)	Watershed



6a. Sections 208 and 303 Water Quality Programs (EPA administered)	E&PC through development and approval of Sec. 303 Basin Plan and Sec. 208 Areawide Water Treatment Plan. <u>Watershed</u> for plan implementation.
6b. Sec. 404 Dredge and Fill Permits (COE administered)	Watershed
7. Clean Air Act (42 USC 1857) Sec. 103, Air Quality Program	<u>E&PC</u> through development and approval of State Air Quality Management Plan. <u>Watershed</u> for plan implementation.

Thus, for the EPA items, the lead will change on individual geographic planning areas when the State air or water quality management plans are approved by the authorized EPA official.

George Nishimoto, regional planner, is assigned lead staff responsibility within E&PC since the interagency coordination work involved is quite similar to his other coordination assignments for Coastal Zone and HUD 701 planning.

Don Willen, Staff Hydrologist, has the lead within Watershed. The assigned work is closely associated with his other hydrology and water quality responsibilities.

State Directors and Service Center Director are encouraged to apportion the lead responsibility between staffs to match the duties described above for the appropriate WO Divisions. It is imperative that close coordination continues between these staffs, especially during the current formative program and legislative changes in progress by EPA and COE.

Watershed is also the liaison with the Department's Water Resources Policy Coordination Staff (formerly Office of Land Use and Water Planning), and is the lead coordinator for "Lower Colorado River Water Acquisition."

George L. Truesitt

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

Denver Service Center

Continued on reverse)

TC 424 .W8 L362 1978
McQuisten, Richard.
State of Wyoming water
management program

BLM LIBRARY
RS 150A BLDG. 50
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, CO 80225

